

June 14, 1930

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AVIATION

The Oldest American Aeronautical Magazine



AIRCRAFT *Drafting* METHODS

Safe Aviation AND THE PUBLIC

THE *Canadian* AIR MAIL



CANS OF INSURANCE

A CAN of TP-Aero Motor Lubricating Oil contains the best insurance against the many kinds of engine trouble caused by faulty lubrication. This insurance makes flying safer.

TP-Oils are now—the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are straight-run oils, see blended or compounded, produced from pure, paraffin-base crude by a process for which patents are pending.

This process has marked ad-

vantages over other methods. It removes all the paraffine wax, while preserving all the lubricating bodies in the crude. Elimination of the wax is responsible for its low cold test.

In terms of performance this means uniform viscosity at all working temperatures, minimum carbon deposit and ignition trouble from faded spark plugs, easy cold priming, immediate oil pressure, perfect lubrication winter and summer, on the ground or at high altitudes—a maximum of safe flying hours.

A handsome, practical Pilot's Log Book sent free on request.

TP-Aero
Valve Spring
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Marked in
Glass
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TP-AERO MOTOR LUBRICATING OIL

HEALD ACCURACY IS "STANDARD" —for all Internally Ground Airplane Engine Parts

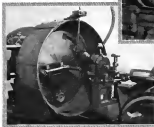
Throughout the Aviation Industry Heald Internal Grinding Machines have become a standard of accuracy, and there is no modern industry that requires the ultimate in accuracy more than does Aviation.

Whether it be a sport plane, mail plane, or a huge transport, accurately ground motion parts are essential to the correct and continuous operation of the motor. Heald ground parts are continuously proving their accuracy and dependability in thousands of planes in the air today.

The fact that airplane manufacturers have ordered and rendered Heald Internals is a sweeping recommendation for Heald Equipment. Complete information concerning the features and applications of Heald Internal and Surface Grinding Machines will be sent upon request.



Above: No. 11A-3 Six-Minute Internal arranged with automatic indexing feature for grinding 12 vent gun bolts, two at a time, in Master Rods. Note dial grinding wheel on spindle of wheel head.



Left: Six-Minute machine arranged with feature for grinding bores in Automobile Connecting Rods. Rods are located by a fixed pin and hand plug and clamped at two points in V blocks.

The Heald Machine Co., Worcester, Mass., U.S.A.

HEALD



SALT WATER SPRAY does not affect Micarta...

SEAPLANES and amphibians encounter moisture and salt water spray and therefore require special application of non-corrosive materials to prevent loss due to these agents. Micarta, the hard-surfaced, strong, laminated phenolic material has proved the most suitable for cabin lining, molding, door panels, window sills and other applications, as salt water, oil, grease, heat and cold have no injurious effect on it. It will not warp, split, splinter or burn readily, and for this reason provides greater safety in case of accident.

And, being finished in several wood and linen designs and in plain colors, it provides the designer with a material for making a cabin job attractive and desirable.

Micarta aviation products also include self-lubricating and ball-bearing control wire pulleys, fittings and hinge bearings.

Service, prompt and efficient, by a coast-to-coast chain of well-equipped shops

Westinghouse



TUNE IN THE WESTINGHOUSE RADIOTELETYPE UNIT ON A C. NATIONAL WIDE NETWORK EVERY BUSINESS EVENING.

SIOUX PORTABLE ELECTRIC DRILLS



On Sioux
Electric
Drill Stand

Sioux Drills
in sizes 1/2
3/4 — 5/8
1 — 1 1/2
and 2 — 4 in.
Heavy Duty,
Also 1 1/2 in.
and 2 — 4 in.
Standard.

Power That Will Surprise You!

HERE is a powerful, sturdy drill that will handle overloads at the full speed necessary for the best results. Sioux engineering has overcome the troubles that mechanics have experienced with other types of drills. Sioux Drills are guaranteed to give long, efficient service.

Great strength is combined with light weight in the tough aluminum die cast body. A cool-running motor is assured with a new improved system of ventilation. Smooth, quiet operation is achieved by the use of ball bearings throughout and by helical-cut chrome-nickel steel gears.

**Your Jobber
Sells Them.**

STANDARD THE



ALBERTSON & CO. INC.
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WORLD OVER



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Best Office
Desired Address
Oxygen
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UNION CARBIDE

Oxwelding— Short Cut to Production Economy

FOR automobiles and aircraft, for giant pressure tanks and tiny radio tube filaments, throughout the whole range of the metal working industries, oxy-acetylene welding is being adopted to production processes.

More efficient products, more quickly made—reduction in unit production costs and capital expenditure for equipment—these are some of the many outstanding advantages that are obtained through the use of oxwelding.

Our service or development engineers can help you to apply oxwelding profitably to your production work.

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ALWAYS MAINTAINING LINEDMEN HIGH STANDARD QUALITY PRODUCTION WE HAVE EMPLOYED ONLY FASTER TRAINED MECHANICS VERY HONORABLE AFTER THOROUGH STUDY AND OBSERVATION YOUR STUDENT COMPLETE INSTRUCTION AND PERSONAL OF STUDENT BODY POSITIVE LINEDMEN CAN ASSURE SOME OUTSTANDING STUDENTS TO INITIAL REVENUE STOP ABLE AND GRATIFIED COMPLETELY AND THOROUGHLY COURSEWORK OFFERED STUDENT BODY STOP INAS YOUR AUTHORITY OFFER EMPLOYMENT WITH AIRMAIL, DURING YOUR STUDENT'S YOUR SELECTION

LINEDMEN AIRCRAFT CORPORATION
EAST ST. LOUIS, ILL.



(Daily) Products of Telegram recently received from the Civil & Jones, General Manager, Linedmen Aircraft Corporation.
(Daily) Linedmen and instructor report, 1935, a Weekly Weekend report of Parks Air College.

Parks Air College was one of the first to be licensed by the U. S. Department of Commerce as a fully accredited training school.

PARKS AIR COLLEGE
DIVISION OF DETROIT AIRCRAFT CORPORATION
683 Park Airport
EAST ST. LOUIS, ILLINOIS



EVERY young man who is interested in aviation as a life work should send carefully the telegram reproduced on this page.

The Lockheed Aircraft Corporation is only one of the many industries in the aviation industry which recognize the supremacy of Parks training and are anxious to give profitable employment to Parks graduates.

Remember this when considering a school for your own training, either as a pilot or as a mechanic and engine mechanic. The recommendation of your school as graduation means everything to you in getting a good job. And a recommendation from Parks will open doors to you which might otherwise be closed—because Parks has an international reputation for giving the most complete, thorough, advanced training elsewhere.

The stamp of approval of Parks will mark you as a capable, trustworthy, thoroughly trained pilot or mechanic. It will help you to step immediately into a place in the most interesting of all businesses. Remember, your recommendation is only as valuable as the character and prestige of the institution from which you graduate.

Remember, too, that no business or profession offers you such opportunities as aviation. The all-important thing is the right training at the right school. When you know all the facts, we know you will select Parks as your training school. Send the coupon for full details today.

COUPON

PARKS AIR COLLEGE,
683 Park Airport, East St. Louis, Ill.

Without cost or obligation to me, please send your literature card.

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Address _____
City _____ State _____
Occupation _____ Age _____

See instructions on back of this card.
Name _____
Address _____
City _____ State _____
Occupation _____ Age _____

Only Goodyear can give your planes

Every great success has its horde of imitations, and Goodyear Airwheels have certainly been

Their success is due, first of all, to the careful engineering which went into their development, and to the months of testing, under every type of flying condition, which preceded their introduction.

You cannot get the benefits of such experience
in any other "low pressure" tire.

Airwheels operate at pressures as low as 3 pounds. Even on ships weighing 20,000 pounds, a pressure of 13 pounds is enough.

You cannot get such protection as Airsheds give to forced landings on plowed fields, mud or sand, unless you get tires which have equally great air volume. Here balloon tires cannot approach Airsheds in safety.

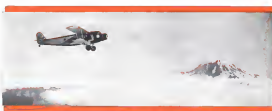
Airwheels are mounted on special hubs, with patented internal brakes, self-centering. These hubs had to be engineered and developed to make the tremendous air volume of Airwheels possible, and they provide the current, safest braking operation known to aviation.

You cannot get these special Goodyear patented habs and brakes except with Airbreds.

If you are interested in the protection which these great, soft, rolling cushions of rubber can give to your ship—in forced landings, crosswind and downwind landings, and take-offs and ground loops—remember that only Goodyear can give your planes Airwheel safety.

Before you undertake the cost of redesigning ships for different tire equipment, be sure the new equipment you select is right. Goodyear invites competitive demonstration. On a Goodyear ship, Airseals will show you what they can do.

For information or engineering assistance in equipping your future ships, write Aeronautics Department, Goodyear, Akron, Ohio, or Los Angeles, California.



The mean is close to 0, which indicates that the distribution is roughly symmetric. The mean is close to 0, which indicates that the distribution is roughly symmetric.

Good Going, Boeing!
Chicago to West Coast!

Inauguration in May of Boeing System's un-manned passenger transport service between Chicago and San Francisco turned a new page in aviation history. The 2000-mile, all-air route is the longest regularly operated air line in the world.

Featuring the service is a fleet of Model 80-A, eighteen-passenger planes with sound-proof commodious cabins, radio telephone, and night flying equipment. The planes carrying both passengers and mail, operate on daily 20-hour schedules between San Francisco and Chicago. Passengers change planes only once during the entire trip.

In keeping with Boeing Air Transport's policy of choosing superior planes, superior pilots and superior products for its service, Boeing is using Phillips '77 Aviation Gasoline on its Salt Lake City-Chicago division. Phillips is proud to have a part in this outstanding Boeing service.

SCHEDULE		
Westward Real Dates	CENTRO SAN JOSE 1500	Eastward Real City
8:00 A.M.	1. General West	Am. 8:00 P.M.
10:15 A.M.	2. Los Angeles City	Am. 8:00 P.M.
12:10 P.M.	3. Santa Barbara	Am. 8:00 P.M.
1:00 P.M.	4. San Marcos	Am. 8:00 P.M.
1:00 P.M.	5. San Jose	Am. 12:40 P.M.
2:00 P.M.	6. Monterey	
3:00 P.M.	7. Santa Cruz (City)	Am.
4:00 P.M.	8. Chico	Am. 8:00 P.M.
5:00 P.M.	9. San Luis Obispo	Am. 8:00 P.M.
5:00 P.M.	10. Santa Lucia	Am. 8:00 P.M.
5:10 P.M.	11. Santa Lucia (Bay)	Am. 8:00 P.M.
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5:10 P.M.	296. Santa Lucia (Bay)	Am. 8:00 P.M.
5:10 P.M.	297. Santa Lucia (Bay)	Am. 8:

For schoolbus and toll-free route
Enrollment in Tennessee: Knoxville, Washington



Source: *Journal of the American Medical Association*, 2004, 292:1025-1030.



EVERYTHING IN RUBBER FOR THE AIRPLANE



Phillips Petroleum Company
Bartlesville, Oklahoma

Editor: William K. Henshaw



HOLDER...World's Endurance Record

THE Original ST. LOUIS
ROBIN now owned by
GULF REFINING COMPANY
exhibiting with the Curtiss-
Wright Aerial Exhibition.

All planes in this
exhibition are using
GULFPRIDE 120

GULF REFINING COMPANY

Leaders in AVIATION Demand the Thoroughness of VON HOFFMANN Training



**That is the Reason...
VON HOFFMANN
Graduates are Filling
Responsible Positions**

Von Hoffmann graduates, busy today at many flying fields and factories are making good. Aviation needs capable men, carefully developed, thoroughly trained. This self is not for mere men but for better men.

That is the reason Von Hoffmann courses go beyond Government requirements. Each man receives simple, clear instruction, intensively given on the most modern type equipment. Employers know that the finest type of pilots and mechanics are trained here by methods which have obtained world-wide fame.

A Government Rated School located on a \$2,000,000 airport . . . modern concrete hangars and classrooms . . . a fleet of Government Approved planes, various late types, open and cable . . . comfortable living quarters with all modern conveniences. Our liberal time payment plan makes it possible for you to pay half your tuition after you have finished your instruction. Make your start in aviation TODAY . . . send the coupon NOW!



Every flight instructor at the School of Von Hoffmann is a transport pilot and each and every instructor has been rigidly examined and licensed by the Department of Commerce to instruct students in conformity with Government License regulations.



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1730 Lambert — St. Louis Airport
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Name _____
Address _____
City _____ State _____
Age _____ I am interested in _____
☐ Flying Courses ☐ Mechanics Course
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Socony Aviation Gasoline is used to refuel this Wright-powered Bellanca plane at the Long Island Aviation Country Club. This club is nationally among country clubs of the world in that it is renowned exclusively for flying as a sport and has its own clubhouse, hangar, and flying field.

Samuel G. Allen

She's off with the first spin

SPIN the prop once, and your engine takes hold—**S**—with Socony Aviation Gasoline. No sputtering as you "rev" her up. Then, when you give her the gun, the smooth, steady power in Socony is apparent from the start.

Just try this fact. Then you'll know why it is so popular with pilots in New York and New England—why Socony Aviation Gasoline is "official" at so many airports. And for complete flying satisfaction and reliability, use Socony Aircraft Oil.

SOCONY

Aviation Gasoline

Aircraft Oil

STANDARD OIL COMPANY OF NEW YORK

Confidence in the take-off...



Fairchild KR-1 A.R.O. KR. Two place.
Top speed 135 m.p.h. Climb 700 ft. per min. Payload 400 lbs.

KR-1 TRAINER. In all Socony Fairchild KR-1s are equipped to operate as trainers. All controls and systems are simple, and the design is such that the student can learn to fly with confidence. The KR-1 is a perfect example of the Socony Fairchild KR-1's ability to operate as a trainer.

KR-1 TRAINER. In all Socony Fairchild KR-1s are equipped to operate as trainers. All controls and systems are simple, and the design is such that the student can learn to fly with confidence. The KR-1 is a perfect example of the Socony Fairchild KR-1's ability to operate as a trainer.

Fairchild KR-1 A.R.O. KR. Two place.
Top speed 135 m.p.h. Climb 700 ft. per min. Payload 400 lbs.

APPROXIMATELY
Weight 2,000 lbs. empty and ready for flight. One landing gear. Double wing with landing gear retractable. All controls and systems are simple, and the design is such that the student can learn to fly with confidence. The KR-1 is a perfect example of the Socony Fairchild KR-1's ability to operate as a trainer.

THERE is one thrill that is utterly unjustified in flying, and that is the excitement that rises as the ship takes off and approaches the inevitable obstructions at the edge of the field. Fairchild has abolished that thrill by giving its KR Biplanes unusual climbing abilities of 775 and 800 feet per minute. You can get off small fields with confidence that the ship will respond to the demands you make of it.

Among these demands is ability to withstand the occasional hard landing such as any pilot makes once in a while. Once landing gear, standard on all KR ships, is an additional help in landing. Fairchild KR Biplanes have extra strength, due to the use of the most rigid specifications. Welds are in shear, not tension. Chrome molybdenum steel is liberally used for its combination of strength with lightness; the structure, strong though it is, is not heavy, and disposable loads are high.

You pay no more for Fairchild wider margins of performance. These ships are indeed ideal for the average pilot and his pocketbook. An illustrated booklet giving full information will be sent on request.

FAIRCHILD AIRPLANE MANUFACTURING CORPORATION
Farmdale, Long Island, New York
Plant: Farmdale, N. Y.; Hagerstown, Md.; Longwood, P. Q., Canada
Export Office: 412 East 42nd Street, New York City
Sole Agent of The American Corporation



FAIRCHILD

NO; WE'RE NOT BRAGGING..
.. But these flying cost figures ARE impressive



Felix Steinhilber, manager of operations for National Park Airways, Inc., out Salt Lake City, says their Stearman C3MB mail planes, vigorously pushed on steady schedules, are great ships. He says it with flying cost figures. We're so sure it's a universal appeal — economy — we've framed Mr. Steinhilber's story, and here it is:

OPERATING PERIOD: JANUARY 14 TO APRIL 26th 1929 (AVE)

TIME DOWN —	HR.	MIN.	MILES DOWN	GALL. GAS PER HR.	QTS. OIL PER HR.	GALL. GAS PER MILE
Jan.	10	17	9,400	11.6	1.04	1.20
Feb.	17	32	10,500	12.0	.90	1.05
Mar.	19	03	11,300	12.0	.90	.98
Apr.	15	06	11,900	11.2	1.28	1.11
Average			10,775	11.7	1.03	1.03

Notes: *Real operators would do well to investigate the adaptability of the Junior Stearman to the problems reported by the Western bell. For every flying reason — STEARMAN Junior Speedster 130 H. P. and 400 H. P. Business Speedster 225 H. P. Write. Write. Telephone.*

STEARMAN

STEARMAN AIRCRAFT COMPANY, WICHITA, KANSAS
 Divisions of United Aircraft and Transport Corporation



Thor

ROTARY DRILLS and GRINDERS

Two Types of Portable Tools That Meet the
 Production Requirements of the
 Aviation Industry



Thor Rotary Drill is made in two sizes of large and small. Both are small, compact and light.

These drills are made in two sizes of large and small. Both are small, compact and light.

Thor Rotary Air Drills, rugged type, are the smallest air drills made. Their weight, size and speed have made them extremely popular. The absolute absence of vibration in these small tools prevents undue breaking of the smallest drills. Made in two sizes. No. 11 has a speed of 3,000 R.P.M. Drilling capacity is $\frac{1}{2}$ in. No. 12 has a speed of 2,800 R.P.M. Drilling capacity is $\frac{3}{8}$ in. Weight is 3 $\frac{1}{2}$ lbs. Length overall is 31 $\frac{1}{2}$ in.

Thor Rotary Air Grinders match the drills in size and weight. They are exceptionally speedy and are also used for deburring and grinding. Made in two sizes. No. 30 has a speed of 38,000 R.P.M. and weighs 3 $\frac{1}{2}$ lbs. Carries a $\frac{1}{2}$ in. elastic housed wheel. No. 4 has a speed of 14,000 R.P.M. and weighs

3 lbs. Carries a $\frac{1}{2}$ in. elastic housed wheel. These tools, being designed on the rotary principle, give remarkable performance and reduce air consumption and upkeep costs. Send for circular PR-106 which illustrates and describes the complete line of Thor Rotary Air Tools.

**INDEPENDENT
 PNEUMATIC TOOL CO.**
New York TOOLMAKERS *London*
PNEUMATIC TOOLS—ELECTRIC **Thor** **TOOLS—AIR COMPRESSORS**
 124 So. Jefferson St. Chicago, Illinois

Thompson Valves from Famous Cylinders



(This advertisement is one of a series showing Thompson Valves from some of the history now makes that used them in setting new world's endurance records)

... from the "St. Louis Robin"

WHEN the St. Louis Robin exceeded the Argosin's endurance flight by 174 hours, Thompson Valves once again vanquished their own previous world's record. For, both of these famous ships relied on Thompson Valves to bring them through the long grind.

And even after the grueling service of 429 hours in continuous operation, the Thompson Valves in the St. Louis Robin were in perfect condition. Two of them, removed shortly after the flight, are illustrated on this page. Their condition is typical of all twelve that flew with this ship.

Repeated practical demonstrations of exceptional stamina such as this explain why Thompson Valves are used today in 95 per cent of all American arm motors.

THOMPSON PRODUCTS, INCORPORATED
General Offices: CLEVELAND, OHIO, U.S.A.
Factories: CLEVELAND and DETROIT



Thompson Valves

Unreached photograph of two of the St. Louis Robin's 12 Thompson Valves after 429 hours of continuous flying.



" a Pitcairn "



Being their place since 1918 and 2 powered. Forward engine equipped with Dual Governor. Full complement of instruments. Single engine arm. Top speed 140 m. p. h., cruising speed 120 m. p. h. Weight 16,000 lbs. 175 h. p. engine. Price fly away factory \$12,000.

There's a proud ring in the voice of a Pitcairn owner when ships and flying performance are the topic.

Starting in the Pitcairn Machwing, veteran aerial craft, the Sport Machwing shows these biplanes which are essential in aerial carrying. Those qualities are first, utter Dependability, day and night, regardless of weather conditions, and second, Stability inherent in the ship—to a degree far above the average.

Machwings have earned for Pitcairn the enviable record of six million air miles of scheduled night flying—and today they fly on twelve different aerial lines on the United States and Canada, more than 10,000 miles each day, in mail service alone!

Mining tests such as these is a matter of routine, becomes possible only in a ship that was never built to a price—a ship whose amazing performance is the result of utmost precision in the making of every single part and infinite care in every detail of workmanship. Let an experienced aerial pilot tell you why he would rather take off in a Pitcairn than any other ship in the field.

Such is the substance of the Pitcairn Sport Machwing. Knew history of line, and complete comfort add of course to the pleasure of owning and flying a Pitcairn—whether you use it to speed the expansion of your business, or whether you fly it for the most stirring sport on earth.

Pitcairn Aircraft, Incorporated,
Pitcairn Field, Willow Grove, Pa.

PITCAIRN

SPORT . . . BUSINESS . . . AIR MAIL



ONCE SKEPTICS NOW FAST FRIENDS with the D. H. MOTH

THEY took the trim lines of the Moth for lightness. They thought that small garage-size planes belonged in army maneuvers. Good pilots and stern critics they were—but they had never flown the Moth. To acquaint them with the facts, Earl R. Southes, manager of the Curtiss-Wright air-base at Columbia, S. C., who flies a Moth by preference, took a 3000-mile, one-man good-will tour.

The tour through six middle-western states, with stops at many airports, was packed with experience that only a Moth and its pilot can meet with tranquility. Line squalls, rain and fog were met and disregarded. Nightfall and unpromising ground brought about a landing in a dry field and—with wing-slats functioning perfectly—a thirty-foot roll to a stop. Over Cleveland, lack of fuel caused another forced landing in a school yard. But, as Southes comments, "Why worry about fuel when you can load a Moth on a dime and take off from the same dime?"



Earl R. Southes, touring pilot. Not the ideal—my preference.



At every airport, well-known pilots were given an opportunity to fly the Moth. Doubtful regard became unqualified enthusiasm. Five-minute hops lengthened to half-hour flights—just from sheer joy of handling the Moth. Its performance was praised again and again. The Moth made fast friends

with all who held hands on its controls.

For training schools, the Moth's ideal, light-as-lightship maneuverability with heavy-skip characteristics, its Handley-Page slotted wings make it practically impossible to spin. Its DeHavilland harmonized control surfaces give instant response. Its heavy undercarriage absorbs the fiercest shocks of student landings. These qualities together with amazingly low-operating cost make the Moth, Wright Gipsy powered, the choice of leading flying schools.

Full details of the Moth and its performance are given for the asking. Address, Dept. 1072

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AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A McGRATH-ELLS PUBLICATION • ESTABLISHED 1891

EDWARD P. WARNER, Editor

VOLUME 11 • June 14, 1930 • NUMBER 11



Second Thoughts on Air Mail Certificates

THE WATKINS BILL is law. We thought some of its provisions had been unnecessary, but opinions of its merit are redundant now. It is with us, and everyone will join in hoping for its successful operation.

The statute is with us. So are the regulations of the Postmaster General, but unlike the statute those are flexible and subject to administrative modification. Adjustment will no doubt be necessary. The wisest body of men that ever lived, completely freed from the influence of every selfish consideration and seeking merely abstract perfection, could not hope to produce an ideal body of rules for the application of such a measure at the first try. It is still wholly in order to examine the regulations and to criticize them, and the freest possible discussion should be welcomed by the Post-Office Department as of definite service in making plans for the future.

The table of most compensation represents a compromise between two extremes. One possibility would have been the establishment of a perfectly flat rate for a fixed load on each trip. That would have had no virtue except simplicity and would have been clearly inequitable. As the opposite pole would have been the assignment, by a board of pilots, engineers, and other persons experienced, of a rating of average inherent difficulty for each route. While the theoretical ideal would obviously have been most wisely attained that way, and we cannot help regretting that the course of individual consideration of individual routes was not given a trial, the practical difficulties are not to be blinked. Any reasonable scheme of rating would leave at least a few contractors with a real or imagined grievance, and anguished cries of favoritism would fill the air of Washington. The intermediate course of setting up a few general classifications is probably the most expedient, even though it is ob-

viously difficult and discriminatory to draw a sharp line between mountain and non-mountain, or fog and non-fog, flying, and obviously inaccurate to group all routes together as operational problems.

The most unfortunate feature of the rules as drawn is the offering of a bonus for multi-engined planes. If the multi-engined machine is to survive it ought to do so on its merits, and without forced stimulus. There is still a distinct diversity of opinion about the universal advantage of a multiplicity of power plants. We happen to believe in the three-engined plane concept, but we have no defense that that opinion is a unanimous one. The bonus feature will be especially disastrous if great care is not taken so to define a multi-engined machine as to make sure that it can operate with any one engine dead anywhere along its route. Putting that aside, however, writing any such detailed features into the regulations is bad in principle. To try to control the design of airplanes by making the submission that they receive depend on their design characteristics is to insist a repetition of French experience of thirty years ago, when a badly drawn ship subsidy arrangement had the serious effect of encouraging a return from steam vessels to those driven by sails. In this case the Post-Office Department may be encouraging a desirable feature, but there is no monopoly of technical wisdom anywhere and the next design characteristic that is elected to subsidize might easily prove a very unfortunate one.

The regulations invite not only criticism but interpretation. They are sufficiently complex so that their real meaning and effect does not immediately produce itself, especially in respect of the combined carriage of passengers and mail.

A subsidy for passenger transport is provided, as was the exemption when the bill was introduced. For the

lost that now carry no mail and get a certificate for the minimum amount of 200 lb, the assistance received will be very substantial, amounting to about \$5.00 per ton mile for mail carried, or on the average about six cents per passenger mile, based on the full passenger capacity of the plane. For the present mail carrier, on the other hand, the unit costs involved are trivial. An operator now having an air mail contract and receiving a certificate covering the maximum stage reservation permitted under the law, will be given extra payment for providing passenger accommodation at an average rate of about one-half a cent per mile per passenger seat offered. The bonus will cover some eight per cent of the additional operating costs involved. We very much doubt the effectiveness of the proposed compensation in inducing the carrying of passengers on mail planes for any operators who would not have done it in any event, and if the business were to have any such effect, we should greatly regret it. It is still true on many routes that passenger and mail transport can best be kept separate. The offering by the Civil Aeronautics Department of any very vigorous stimulus to combine the two in the same plane would be very unfortunate.

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Pity the Poor Department of Commerce!

WHATEVER may be thought of Senator Burton's knowledge of aviation or his general good judgment, he deserves the highest rating on persistence. When he conceived the plan of requiring the Department of Commerce to make public all the facts pertaining to all aviation accidents he attracted little sympathy from his colleagues and less from the general public. The arguments in favor of publicity as a general policy under present conditions, and especially of intensive publicity, were scanty. The arguments against it were abundant and numerous. During the six months that have passed since the Senator from New Mexico introduced his resolution, the Senate as a whole has continued inert. None the less, the measure has drifted to victory, aided by the very inertia and by the inertia, upon which the Senatorial action seems often to be facilitated, that it never does any harm to investigate anything.

The Burton resolution in its final form was almost unanimously opposed by those combining a regard for the welfare of the traveling public with a knowledge of aviation, and the confidence under which air transport is conducted. The two things are quite compatible, notwithstanding Senator Burton's apparent attention in some of his speeches that the interest of aviation and the interest of the American people are two quite distinct and conflicting affairs, and that the aviation enthusiast is naturally indifferent to death and disaster.

The general principle of accident publicity was not

involved. There is much on both sides of that question and a great deal in favor of at least releasing certain facts—the length of the pilot's experience and the type of license that he held, the type of machine and engine and their technical history, the field conditions, and so on—without making public speculation or interpretation. There was nothing in favor of the backward-looking inquiries that has now been imposed upon the Aeronautics Branch, involving as it does the publication of conclusions drawn from testimony received under the implied pledge of confidence and the public pillorying of men who have never received notice that they were to be made defendants or less given opportunity to call witnesses and make argument as their own behalf.

New duties are constantly being imposed upon the Department of Commerce, and they must be provided with new means for accomplishing them. The Bureau of the Budget, making its observations for the Aeronautics Branch, will have to face not only a steady increase in the magnitude of the Branch's normal and special activities but also an assumption of new and varied responsibilities. The work of investigating every future accident in such detail as the preparation of a public report with allocation of responsibility demands will necessarily increase the burden now carried. Re-appropriation of some sort will be needed to meet a new problem, and it is to be hoped that Congress will at least be liberal in providing funds for undertaking the task that the Senate has imposed.

//

Bringing the New Idea to the Old Shop

IN THE present metamorphosis of the aircraft industry there deeply exists crisis forth a pessimistic thought which has no foundation in fact. There is vain fear for the stifling of pioneering development in aviation. On the premise that the aggregate available manufacturing facilities of the industry far exceed the diversified demand for planes, there is a school of thought that sees in that situation a bar on new inventive developments in aviation. The launching of a new factory or plant to develop any really novel or untried type of design would be unwise they say, if not impracticable, at this time. Save for the doubtful possibility of selling an embryonic thought to an established manufacturer as the necessarily sacrificial price of an unaccommodated idea, they harken to the realm of abandoned ideas the pioneering thought of the new school of engineers and inventors that the industry has attained to reach.

Yet the present situation viewed calmly and clearly, presents the greatest opportunity for a man with an idea that the industry has ever offered. It is no longer necessary to go through the pangs of manufacturing to attract capital to finance a new plant, to compete with established production industry for personnel and materials, and to

after all the delays, setbacks and disappointments of such a comprehensive undertaking. The task of developing a new idea has been vastly simplified.

No longer need the inventor or technical pioneer include in his makeup all the qualities of promoter, financier, building contractor and factory manager. For a cost positively trifling one can literally hire that part of an established aircraft organization necessary to develop his idea—by merely expensing his job and placing the mental construction with one of the present airplane manufacturing plants on contract. He may go even one step farther, and sub-contract his job to different units or specialists—expensing detail in one specializing organization, fuselage fabrication to another, wing construction to a third, and as on, dependent upon the nature of his idea and his own individual desires. Not only is this feasible in theory, but a responsive and cooperative reaction awaits it in fact. Companies which would have found it impossible to reach second-hand experimental work in your age are quite in a position to assist in new development. The plan is literally devoid of sacrifice—never before and perhaps never again will it be so easy and inexpensive to develop and demonstrate a new idea in aviation. The present opportunities for sub-contracting development work as new ideas provide a splendid silver lining to current necessities.

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Giant Airplanes

DO YOU KNOW where there is an airplane with inadequate performance? A machine with a radius of action smaller than is necessary for its work? An air line that fails to make profit on the carriage of passengers? The solution to all such problems, we are positively assured, is easy. Double the span and quadruple the weight of the plane and all will be well. When a small plane fails a large one will long succeed success, if only it be made large enough. So runs the argument.

There has been little in past experience to provide backing for so remote a view of the inherent effects of increasing size. There is little in theory to support it. It repeats in part upon instant, in part upon a longing that runs deeper to all past rebuffs. The idea of a huge machine is appealing, confidence-inspiring. Therefore, the huge machine must succeed magnificently. It must sweep the field and accomplish miracles, even though in defiance both of history and of theory. Elephantoism is an attitude that can afflict machinery as well as human beings.

Unfortunately, we face the ultimate necessity of making our aspirations square with the facts. Look back over the long line of giant planes that have been airplane failures, that have been partial successes, and that have been satisfactory flying machines but as no way

extraordinary in performance. Look at the Daring Bomber, the Tarnant Triplane, the Richard-Pentoth Flying Boat, the super-sized Caproni, the German wartime giants, the NC boats, and a host of others, down to the Do-X, the F-32, and the largest and newest Junkers Sme, especially among the recent productions, have been confident of their kind and are giving excellent results in almost daily trial, but hardly a single instance of abnormally large size has shown itself really reasonable by the standard of its time in speed, range, or economy. Not one holds, or has held in any recent time, a world's record for anything except weight-lifting.

Two years ago, when the fact that the Do-X was under construction began to be matter of public knowledge, that each became the subject of a host of confident predictions that commercial trans-Atlantic operations was at hand. In due course the plane was completed, and proved to have very interesting and valuable qualities, but the ability to cross the Atlantic without stop and carrying a commercial load was not among them. The rubs of action, in fact, appears to correspond closely to the saved attainment of flying boats of much smaller size. Now the optimistic prophets, recovering from their shock, are beginning to make themselves heard once more, declaring that the only thing wrong with the Dornier was that it was not big enough, and they are pinning their faith anew to another projected German craft of yet more magnificent dimensions.

Radius of action and economy alike depend on half a dozen simple and well understood factors—propeller efficiency, tail fin consumption, and the like. Some of them favor the large machine, some the small, but in no case to the inherent advantage for the large machine as such of great importance. A detailed theoretical analysis made five years ago found the greatest possibilities in the machine of about ten thousand pounds gross weight, and the record of the spectacular long distance flights made and the duration records established since that time goes on the whole to confirm the calculation.

We have no idea of bettering the giant airplane. It has real merits. It offers positive shortcomings in a flying boat, convenience and variety of interior arrangement in both seaplanes and landplanes, maintainability in similar cases. It can carry a larger crew and more specialized servicing equipment, but there is a limit to its accomplishments. Increase of size is not the open avenue to either technical or economic problems. Within wide limits of size, and of course excluding very small machines, carrying capacity, power, and operating expenses vary in the same manner. Comfort tends to increase with size, but tends of maneuver to decrease, and speed and climb remain virtually unaffected. To ignore the merits of strength will allow the present average size it were to be foolish. It would be more foolish still to assume that such machines are to sweep the field, or to suppose that an aircraft operator can economically improve his position by adopting them.

uniformity of the particular design. Many more drawings can be made to an initial type which will adequately serve all future needs—either then having to be modified or retained in type because of a lack of proper consideration at the inception of the project.

In the particular consideration of types of aircraft drawings which follows, it should be definitely borne in mind that these are not presented as a universal solution, but only to bring to attention the usual conditions which are involved. By so doing, it is hoped primarily to draw attention to the inherent ramifications of the problem, so that if such a scheme is undertaken, the temptation to default by mere local guarantees is avoided. While decisions may well be even more difficult than here given, it is felt these approach the optimum. It should also be noted that while the different types are referred to by name, such names are practically meaningless in a strict technical sense, and letters or symbols may serve equally well for identification.

Full Production Type

These drawings are listed as being of use for mass production, and in general, with the exception of aircraft engines or certain accessories are not particularly adaptable for use at the present stage of progress in the industry. They, therefore, represent an ideal, and are included so that the trend may be complete.

Such type drawings include complete assembly and part drawings such as individual detail. All drawings should be completely detailed and dimensioned with complete bills of Material, part numbers and specifications on each drawing. A complete consolidated Bill of Material for the job as a whole should also be provided.

Modified Production Type

As stated as comprehensive as the preceding type these drawings are, and are easily adaptable for the same purpose, except that they permit certain typical groups which would draw time and in no way reduce the value of the drawings. They may be considered as the intermediate equivalent of full production drawings as they exist in other industries and as defined in the following section.

This class of drawings includes complete assembly and parts drawings with assemblies and parts grouped on the same drawings as in detail. Tabulations of parts based on typical part should be permitted only for simple variations, such as diameter and length, and should not be permitted for drawings which have intricate detail measurable only by layout. Complete Bills of Material, part numbers and specifications should be used on assembly, group or part drawings as most required.

Development Type

Drawings of this type are most logically used for experimental development work and small production orders. In many aircraft organizations they would be the type most greatly used, being particularly suited for experimental use.

This category would emphasize complete assembly drawings with typical section assembly and part drawings illustrating the type of construction where parts are similar in construction, but vary in detail or proportion, such as on hulls, wings, floats, etc. Complete part drawings for castings, forgings, built-up and machined (fabric) assemblies, or other than the assembly shop are desirable. Over-all and essential dimensions are shown on assembly drawings only, parts are dimensioned

only for the castings, forgings, built-up and machined forgings previously mentioned and where absolutely necessary for clearance.

A complete detail Bill of Material is not required, but a reasonable advance list of material requiring purchase should be furnished. Complete Bills of Material and part numbers are provided only for typical sections, such as frames, ribs, etc., using tabulations and notes as necessary to indicate and describe all part numbers similar to parts shown on typical section drawings. The other sections and parts are developed in the shop and identified, patterns, etc., carefully marked and stored for future use. Conventional parts are not assigned part numbers, but are identified consecutively, unless they are standard parts.

Experimental Type

This classification of drawings may be used when time is a prime consideration, but should be confined to jobs probably not subject to repeat orders or further development. While one of the most useful types, this is also one of the most troublesome types, in that, while it most quickly accomplishes a given job in the shop, it does not always promote the most quickly built job, unless shop co-operation is very close. Likewise, these drawings are not as easily converted to some of the more detailed types previously discussed, as general executives sometimes believe.

Less drawings and diagrams usually drawings indicating the location of section assemblies such as frames, longitudinals, etc., by center line are used. Similarly, typical section, part and part drawings are utilized wherever feasible. Complete part drawings for castings, forgings, built-up and machined forgings manufactured in other than the assembly shop, including specially joined parts, are still desirable. Over-all and essential dimensions of assemblies and section assemblies are shown, with parts dimensioned only for the castings, forgings, built-up and machined forgings previously specified, and where necessary for clearance.

A detail Bill of Material is not required, but a rough advance list of material requiring purchase should be furnished. Assembly drawings should have a key table attached to the drawing, listing assembly drawings, assembly drawing numbers and part numbers of separately detailed castings and machined parts, no part numbers are shown on drawings, but are assigned in the shop. Bills of Material, for record purpose and possible later use, including part numbers assigned in the shop, may be prepared by permission between the drafting office and the shops, being compiled in loose-leaf form and stored on cardstock (key prints) by the shop. Notes are freely used on the drawings, and extensive communication between the drafting office, shops and planning department.

Sketch Type

Sketches may be used for emergencies, minor repairs, minor experimental jobs, tool, etc., where regular drawings are not desired or necessary. They represent the minimum of drafting work and should be authorized at a type only with considerable caution, and never for a complete phase.

This type embraces only general information and essential specifications, controlling dimensions, etc., used in the above classification. It is usually by hand. Specifications may include material, gage, heat-treatment and finish, where necessary or desirable. All details are



A comparison of British and American methods of drawing the same fitting



worked on in the shop. No regular Bill of Material of any type is used, and part numbers are used only as they apply to existing drawings, no new ones being created.

Detail Drafting Economy

The whole matter of type drawings naturally centers about the savings possible in time and cost in starting and completing shop production. Definitions have been purposely generalized, in the belief that specific illustrations of possible greater order each type would place an undue emphasis on the examples, and might also imply a limitation to the particular type that it was not intended to convey. However, there are certain detail aircraft drafting economies possible which apply either to all types, or where they are limited to certain types, the application will be obvious. These are now listed, not as a complete list, but as an indication of the possibilities.

(1) Symmetrical parts may be shown in half view. Care must be exercised to indicate that the view is not half view, as an experience is known where a shop inadvertently cut a casting in two. This should of course not be carried to an absurdity, as showing a sphere in half view. In a few limited cases, a quarter view of a part symmetrical about both center lines may be used.

(2) Parts should be drawn to one hand (left hand preferred) and marked with a part number only for the other hand. This is current drafting-room practice.

(3) On a general plane where there is a repetition of parts, the parts should be drawn in only at one location and the other location indicated. This is common drafting practice in the case of rivets, but should be followed in other instances, such as a wingroot hull door with numerous flaps.

(4) Repeat should be had on typical construction drawings, whether symmetrical or shown completely each detail. The outstanding example of this is fast construction where the frames are essentially similar and differ only in dimension. The frame centers may be listed from the odd left foot so there is no need of detailing each and every frame.

(5) Many views, positively symmetrical, can be shown by indicating on one side only the way in which it differs from the opposite. For instance, as engine mount with a starter bracket on one side can be drawn with the starter bracket side shown complete, with a dimension line to the bracket is centered on the opposite side.

(6) In the case of ribbing or wiring, considerable work and some confusion may be avoided by drawing

number only as to be informative as a tabular definition for example a pipe union.

(8) In showing the location of a part, excess detail should be avoided—where sufficient of the surrounding "territory" to properly locate the part but do not include a lot of superfluous details of this surrounding "territory."

(9) In detailing parts for manufacture, they should be shown in their natural view, that is, the view most easily drawn and most easily read. For example, strut fittings may be indicated in the view of the struts, not the struts' axis. To show the end fittings on their part relative to the struts' axis, makes a difficult drawing which is also difficult to read—the simpler drawing relative to the fittings' own axis should be used.

(10) Two views should be used wherever possible. Whenever a third view is necessary, however, its necessity should be shown in adding it. Sometimes it may be necessary to draw the third view only in outline in order to clear up the detail, in which case it may be so drawn, but shall be marked "Third view to show—". In this connection, it is suggested that every new view be clearly marked as to what and where it is.

(11) In drawing in screw threads, no useful and is gained by actually drawing the threads—a simpler practice is to draw the line touching the tips and roots of the threads, and mark the drawing with the type of thread to be used.

(12) The datum area should be made of the SAE and A.S. Standards. In indicating standard parts on an assembly detail of the standard parts should be omitted, only as outline and sufficient information for assembly and maintenance being needed.

(13) Shading and other fancy drawing should be avoided. To draw the fibers in a rope, or the wires on a cable, is useless work. Work drawings, not works of art, are needed in aircraft drafting.

Conclusion

In conclusion, it may again be emphasized that the points considered included primarily the possibilities inherent in systematic aircraft drafting, the need for established type drawings, and the necessity for selecting the type of drawings a given set of design points represent. The general criterion can contribute greatly to his co-operation in the work of the job by establishing the type to be used from the background of his broader knowledge of policy and general plans, while at the same time he may check the progress of the drafting work by the application of the common-sense detail observations on time-saving possibilities.



Various workers working inside on a Ryan motor job at the St. Louis factory

By LOUIS L. WEBER
Ryan Aircraft Corporation

MANY EXECUTIVES will ask the need of a code system as materials. Code systems are generally reserved and hard to get to the uninitiated man just about nothing. So before explaining the Code System in use at the Ryan Aircraft Corporation it might be well to show just what brought about its necessity.

Production orders are issued for a set of plans, which not only call for the work to be done but also serve as material requisitions. They may be for any number of planes, the material will not vary unless it is a special job. The plane is split up into a number of assemblies and subassemblies comprising fourteen of the former: Airframe, Controls, Engine, Landing Gear System, Instrument Board, Left Struts, Motor Mount, Oil System, Power Plant, Seats, Tail Wheel, Undercarriage and Wing; and many-chosen of the latter. These are still further split into parts. Formerly the complete bill of material was written on each order for the number of units to be manufactured. This writing took a great deal of the production department's time and when the order was returned from the stock room, the scrip revealing from the fabrication of parts would have to be added.

By the time the order was returned to the Accounting Department, it was as different as a "before and after" advertisement for hair oil, beauty clay, or what you will. In some cases new order slips had to be made out as they were so many errors on the originals. So it was decided to issue an order calling for a certain subassembly for as many planes to be made, being as material. Thus the stock room had to fill in the actual amount used, regardless of the scheduled amount.

This did not however do away with scheduling as a

A Code System FOR AIRPLANE MATERIALS

knowledge is advance of how much material should be used. The next suggestion was to get the stock room the list of the current amount of material necessary for each unit. On some of our subassemblies we have as many as 75 different types or kinds of material. In order to make it necessary to put in a special filing cabinet or make out a large sheet of paper with all the different complete descriptions of materials, it was decided to set up a code system.

It was felt that a code system would cut down the amount of writing done by the stock room to about one-half of what it had formerly been. It is a great deal easier for instance to write "1031-25a," than to list "P-24HWG-1025 Steel Round Tubing," although that is what the code symbol stands for. It takes but a fraction of the time and even where there are a number of fittings of "1025 Steel Round Tubing," this or check marks need to put under but one symbol rather than four words or symbols, which is necessary when the words are written out.

The Parts Stock room is bothered but slightly with written requisitions or a loss of time through long descriptions of raw materials. However it must have some system of marking. Manufactured parts are marked in alphabetical and numerical order according to our drawing number system. The code system supplements the drawing numbers and is used on all bought parts, and these are filed up side in alphabetical and numerical order following the drawing numbers. Now it is possible for anyone to find an article in Parts Stock with great ease providing he knows the drawing or code number. Needless to say previous to this time the Parts Stock clerk was the only one who could find anything in his stock room.

WHEN we now consider the question of a code system from the standpoint of the production department and the stock rooms. Next we will take up the perpetual inventory. What good will a code system do in this end of the business?

Many items of material are designated by several words of description, thus: 1025 Steel Round Tubing, Soft Aluminum Tubing, Sheet Copper, etc. Still the first item be listed under "tubing," "steel" or in hardware, shall the second be listed under "tubing," "aluminum" or in hardware, and the third under "sheet" or "copper"? At the time that the code system was inaugurated it was found that there were approximately half a dozen or more materials listed under two different

FOR MATERIALS

headings, at the same time. The inventory clerk was quite perplexed at the work but now with a code system there is less danger of duplication regardless of the operator's experience.

On the bill of Material, a code system is used, both by subassemblies and consolidated bills. The cards are five by eight, one card to each subassembly. These are filed horizontally and also into five sections vertically which makes 75 sub-divisions, each, now and as-cards index side. A full description of each type of material would be impossible in such a limited space without coding. But using a code system it has worked out well and left sufficient room for the amount of material required, per unit plane.

Thus the planning department needs but 64 cards showing all the material required as a set plant Ryan Douglas and the stock room needs a duplicate of this set to give them all the information necessary on the material to be used on a plane. The production manager needs no long bills of material and the amount of work of writing is cut down from every angle. It might be mentioned here that the stock room cards are corrected

A Description of Ryan's Factory System Which Eliminates Unnecessary Production Department Detail and Speeds Up Results in Cost Work

is the Planning Dept. whenever a new order is issued. To continue on to the code itself. It was found that materials could be divided arbitrarily into four classes raw material which could be coded, raw material which could not be coded to any extent, raw or finished material which was included in the Army and Navy Standards Book, and finally finished material of some value. These divisions will be taken up in more detail later.

The Army and Navy Standards Book contains many items such as bolts, nuts, pipe fittings, etc., and numerous other parts which are made to A-N specifications. We have made this section as far as possible. The Ryan system starts where the A-N code leaves off and is used entirely supplementary to it.

We found that materials could be divided into classes, such as Aluminum, Brass, Copper, Duralumin, Steel, etc. Also that they varied as to their hardness, as well as half hard and hard in the case of some metals, and Mild, 1025,



A general view of the final assembly line at the Ryan Aircraft Corporation factory

ADVANTAGES OF

Trailing Antennas

FOR AIRCRAFT RADIO

By C. FRANCIS JENKINS
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Regarding the Superiority of the Trailing Type Over the

THE AVIATION DIVISION of the Department of Commerce is preparing to issue an order requiring all passenger planes to carry two-way radio communication apparatus. This order is in line with the "safety first" policy of the Department, and generally meets with the hearty approval from the air transport companies.

Among engine makers, however, this is not so favorably received because the radio antenna must, that two-way communication is possible only if the engine ignition system is shielded in a specific manner.

And the engine builder is easily satisfied in his position because the harness introduces the hazard of short-circuits in the high tension wiring, with consequent failure of the engine, and resultant forced landings.

And after spending so much time and money, in producing a two-stroke engine, proved to be such by having kept it continuously in the air for more than two weeks the engine builder hardly feels that he is fairly required to go through another long, costly development because the radio men insist on getting his aerial within the radiation field of the engine ignition system.

It is believed that the engine builder is justified in his insistence that the radio man work out his own problem without jeopardizing the dependability of the engine.

The writer, in work for a solution of the problem, bought a duplex coil plane with a J-5 non-cylinder engine for the necessary experimentation. The engine wiring was not shielded, nor was the plane bonded in any way.

In the belief that there was an interference-free zone available invariably, an exploration of the ignition radiation field around the plane had been undertaken. It was found, as suspected, that a radiation shadow existed behind the fire-wall in the plane. If, therefore, the antenna



The wire trailing aerial which picks out the trailing antenna and leads it back to the engine.

be located within this shadow no ignition interference should be encountered. And such proved to be the fact. An antenna extending rearwardly instead of vertically picks up no engine interference or phase issues.

BUT, as a further advantage, all of the phase interference that he flows in a length best suited to the radio wave lengths employed, without violating the hazard of a vertically depending antenna, that is, an antenna of a length equalled by the fundamental of the wave length may be down all of the plane with the best radiation factor, and when used for the receiver has a large pick-up without at the same time picking up engine radiation interference.

The resulting large gathering power of this length of wire gives ample signal strength in the headphones with relatively small amplification in the receiver. A 25,000 gain in the receiver with this long picking wire gives



The antenna from the airplane radio set is attached to small wheel which after passing through tailfin guide on top of radio, as indicated by arrow.

Vertical Antenna From the Standpoint of Aircraft Ignition Shielding

signals the equal of a million guns and a seven-foot mast antenna.

With such a large signal pick-up as is attained with a long, interference-free antenna, a light-weight, simple, responsive receiver is all that is required for adequate transmission and reception over a distance of two hundred and fifty miles, so that the smaller planes can carry two-way radio sets as well as the multi-engine planes.

Where the weight of a 150-lb. transmitter-receiver set is not so important a larger large-gain receiver may be used with the resultant advantages of both the long, interference-free antenna and the larger gain receiver.

With a long, air-flying antenna and a million-gun receiver, loud-speaker entertainment is available in a cabin plane, or even television and motion picture entertainment, for that matter, for the antenna has proved, on test, to be just as free from ignition interference in a biplane plane as in a single engine plane.

But best of all the radio man does not require the engine builder to jeopardize the dependability of operation of his engine by the hazard of possible short-circuits in the proposed ignition harness.

Long antennas are not so preferred to short ones, in the air as on the ground, because they induce smaller signals and eliminate many variables, causing more reliable communication.

Perhaps just as important a consideration of the long, interference-free antenna of large pick-up, is that the small-gain receiver can be operated with dry batteries so that the set can be worked when the plane is down. These batteries can be recharged when used up just as fuel and oil for the engine are replenished.

With a small wheel-sock to pull out the wire after the plane takes off, and an automatic wind-driven reel-

just into action as the pilot starts his glide to a landing, the radio equipment is well adapted to the road plane.

There are incidental advantages, i. e., of less wind resistance, with an antenna sloping along longitudinally in the air stream, than in a vertically depending wire with a lead line stream dragged across the air. And there is less trouble with ice formation on the wire.

When the air-flying antenna first begins to come into use, there was some question whether it would work well in picking up "directional" signals from the crossed-loop type of transmitter which the Government is installing on the airports. But this has now been proved to be successful as a vertical antenna, and planes fitted with radio sets and air-riding antennas are duly flying these radio beacons, radio-directional airways.

THE observation "directional radio" is a misnomer, however. The beacon guides of the airports do not guide the plane by directional effect on the radio receiver aboard the plane, but only because of the signal strength of the two signals in the headlight or sighting forks, changes as the plane gets into view and the other of the two overlapping broadcast beams. Each of the two transmitters at the ground station is broadcasting a distinctive signal representing right and left respectively. These varying signal strengths are interpreted by the pilot to indicate true course, not by an automatic directional receiver. Therefore, a vertical wire is no more efficient than a horizontal antenna in picking up these signals, or is the pilot's translation of them.

With the advantages of the air-flying, interference-free antenna, and no disadvantages, there would seem to be no excuse for leaving antennas in the igneous radiation interference field of the engine, requiring shielding and involving the hazard of engine failure.

Safety in AVIATION AND THE Public's Reaction

By MAJ. JOHN J. JEFFERS

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THOSE WHO are interested in the progress of aviation, and who wish that progress to continue, would do well occasionally to remind themselves that man is essentially a bad animal. He is not born with wings; he is not born with any inner urge to leave the ground. But he is born with a very lively fear of the unknown, of the unusual—a fear that he loses only when the unknown and unusual become to him the known and usual.

To man in the mass, the realm of the air still is unknown; therefore he still is afraid of it. To be afraid of what he does not know is man's natural attitude toward every new condition the conditions has. In his attitude toward air travel he is following only the natural tendency of the human race to fear the unusual.

And that air travel is destined to expand, nobody will deny. Since time immemorial man has traveled on the ground, he left the soil and known earth under his feet. Only after thousands of years of gradual expansion did he come to travel himself without fear to the more unstable element of the world. Only after many more thousands of years is he trusting himself, somewhat hesitantly and to very limited numbers, to the most unstable element of air.

This he has been induced to do in a very short space of time, largely by means of the amazing amount of publicity that aviation has received. Man has been persuaded to fly, not by what he personally has seen of aviation, not by what he actually knows of it, but by what he has heard of it.

At the risk of seeming to stress the obvious, I must elaborate this point, for I am convinced that to some

minds even to those in the aviation industry itself, it is not obvious that the public has been encouraged to fly, not by the progress we have made in perfecting aircraft, but by the fact that we have been able to tell people that we have made that progress.

The rapid advances we have made in the last few years, while they would have advanced the science of aviation, would not of themselves have advanced the public's use of aviation. To make the public accept flying as we have made them accept radio or any other new idea, it has been necessary to tell them about it. And this business of telling them about it has itself advanced to such a degree that in only a few short years we have been able to advance almost every living human being that aviation has arrived to offer him yet another service.

Because of the very perfection of this science of communication, by the printed word, by radio, by telephone, by picture, there lies for aviation a danger as well as a help. The same medium that has enabled us to broadcast the benefits of aviation also serves to broadcast some of the disadvantages. The same newspaper, for example, that carries the story of a season of successful airline operation may carry also the story of a crash in which several people were killed. The first story would be what we call "favorable publicity," while the second would be what we call, somewhat unkindly, "unfavorable publicity."

As the public has been persuaded by publicity to use the air as a medium of travel, it is a safe assumption that it is the favorable, and not the unfavorable publicity that has caused that use. From which we may draw the



Greeting airwomen. View of the 1939 Ford Tour was expected by the public at Waco, Tex.

logical conclusion that if at any time the unfavorable publicity should become greater than the favorable publicity, the effect of the unfavorable will become greater than that of the favorable on the public mind. In other words, if it then arrives when the unfavorable publicity becomes greater in mass and in spread than the favorable publicity, a most follow that the favorable things we can say about aviation will have less and even less effect; while the undesirable things will take larger and larger in the public consciousness. That condition, unfortunately, already is appearing.

So much has been written about aviation, so much has been said, that the business no longer has the news value or evokes the reader interest it did even two years ago. When Col. Lindbergh made his sensational flight to Paris that news value had reached its maximum, and ever since that it has been going steadily and surely down ward. Each ocean flight received less and less publicity. The same has been true of the airforce. The first airline publicity was welcomed eagerly in the press; but today such publicity is taking its place on a plane with that put out by other industries. The fact that an airline is adding another scheduled operation evokes no wider mention than the fact that a railroad is adding another extra fare train. That is a good sign, for it shows that people are taking aviation for granted and are accepting it merely as another medium of transportation.

To prevent that desirable condition, however, we have the crash news, which, instead of growing less with the natural progress aviation might be expected to make, actually is not growing less. Although the number of crashes suffered, compared to planes operated, is growing less than it was a few years ago, the fact that there are so many more planes being operated leaves the number of crashes reported in the papers at about the same number they were before. The effect of which upon the public is to make them uneasy—*E-frauded* though the assumption is—that airplanes are not growing safer.

Allowing that favorable publicity is having less and less effect—and as the mass of it is so much less there can be but little doubt that it is less effective—we must face the fact that the unfavorable publicity regarding crashes, which remains at about the same mass, must be having the same effect it always had. At least, that is a logical conclusion. Nor can we console ourselves with

the thought that both kinds of publicity are having equally their undesirable effect. For we know that the public's interest in railroads and steamships, for instance, is very slight, while their interest in a railroad wreck or a steamship disaster is intense.

THE SAME observation applies to aviation. That an airline function which for months goes unmentioned, but that one of its airplanes eventually crashes and kills people creates columns of news in every newspaper in the land. If the crash happens to be sensational and the death toll high, the accounts of that crash are almost invariably followed by a list of former crashes. Each crash, therefore, has the effect not only of belittling that one crash permanently before the public, but also of calling to mind other preceding crashes. The total effect of which is further to undermine the public's confidence in the airplane as a safe medium of travel.

Incidentally, the practice of censuring newspapers for publishing crash reports, with large headlines calling attention to them, has proved to be ineffective. A crash is news, interesting news, and so much it will be permanently featured. The newspaper's duty is to give its readers the news, and it will continue to do so. The only way to stop news of crashes is to stop the crashes.

If it is a fact that favorable aviation publicity is losing ground while unfavorable publicity is holding its place in the public's interest, the only sensible course is to follow in to correct the condition by lowering, if possible, the amount of unfavorable publicity. And the only way we may do that is by lowering the number of crashes. Let us make a study of only one phase of the crash situation to see if we may derive any conclusions that will help us to other conditions that may lead to crashes with their resultant adverse publicity.

It is noticeable that practically all of the crashes that have occurred the widest and most unfavorable exploitation have been those suffered by airlines that have the best equipment and employ the most experienced pilots. The selective publicity following crashes suffered by small operators carrying passengers around their fields has been very slight compared to that given the industry by these large and supposedly better-run organizations. No single crash suffered by a small operator carrying passengers on pay hops added a field has ever exceeded the publicity or done aviation the harm that has been done by

With the details of recent disastrous airplane crashes still fresh in the public's mind, it seems altogether fitting to publish this rather interesting discourse on man's fear of the unknown. In this particular case, man's fear of the unknown is the un-announced public's fear of flying. As

Majors Jeffers points out, we must stop crash publicity not by trying to throttle the press, but by stopping crashes. Then and then only will we succeed in removing the public's fear of flying, and get it to regard the airplane as it now regards the steamship and the railroad train.

three spectacular crashes suffered in foul weather by passenger airlines and air mail lines.

As a matter of fact the proportion of bad crashes to planes operated as suffered by the small operator compared to the airlines is massive, but less considerably so. [This is a somewhat startling statement, contrary to the general impression. We happen to know that the author makes it only after careful consideration of a large body of data.] Small operators' records at times do not in the least reflect the better of the moment (and of flying) but beginning to show—bad. The reason for this cannot be that the small operator has better equipment, looks after it better, or has better pilots. The reason must be that the man operating around the field has carried people only in good weather. If the weather was bad, either he didn't go up, or he stayed around the field on which he could land quickly if the weather grew worse.

THE AIRLINE on the other hand had to carry its passengers across country where the plane might run into varying degrees of foul weather, and it was obvious that the crashes that have resulted in the most widespread and adverse publicity have been caused by bad weather flying.

To suppose that all flying in bad weather should be discontinued would mean a shutting of gates. The operator would reply, and with truth, that one of the foremost of successful operation is to maintain, so far as is humanly possible, regular and uninterrupted schedules. He would also state that a private operator is safer and that he is already making every effort to guarantee safety and regularity of schedules. No one doubts that he is doing just that. But everyone also knows that in some few instances he has not been successful.

The questions that naturally present themselves are these: Is the operator justified in endeavoring to maintain schedules, that is, to fly in weather conditions which have occurred? Or has the adverse publicity following a crash more than offset almost any account that would accrue from flights being controlled in doleful weather?

These are questions that cannot be answered by any individual or by any airline. They are rightly questions to be answered by the whole aviation industry, of which the airlines form only a part. For it is not only the airline that suffers from the publicity effects of a crash. It is the whole industry.

The writer does not presume to suggest answers to those questions, but he does feel that a frank statement of certain phases of airline operation may properly be discussed in an endeavor to present facts from which conclusions may be drawn by the industry.

The first phase to consider is the weather. Bad weather—what everyone agrees is too bad, for flying—this means the crashes. It is the weather that is not good, but that still seems not bad enough to warrant conclusion of the flight. And right at this point we encounter the human judgment, which is not infallible. At any one time pilots or even operators may consider too bad for flying, another pilot, or engineer may consider to be quite safe. Both, let us suppose, have received identical reports from the same weather station, yet both may have come honestly to two very different conclusions. One says the plane can go through, the other says it should not attempt it. Either or both may be right.

The plane may go through safely, which will prove to the manager smart upon maintaining schedules that the flight was properly authorized upon. But even if it gets

through the other and some cautious engineer may still be convinced that the hazards involved make the flight inadvisable.

The safe course is, of course, invariably, to never to discuss the airplane as a vehicle, although it is a possibility, but not a certainty. But that course is followed, the record of schedule regularity will be low. Airplanes cannot fly only in the best of weather, if they are to be of any service as mediums of rapid transport. On the other hand, if the crashes that have occurred in the past year are to continue there may eventually be no necessity for airlines to operate at all, for they may have no passengers.

The whole question of what constitutes weather too bad to fly through is a very involved one. Even with the excellent weather reports now available in the nation it is impossible to say exactly when the weather conditions may be at all places along the route.

At two weather stations, 100 miles apart, the report might show a ceiling of 500 ft. and a visibility of two miles. At some places along the line between those two stations, however, especially in hilly country, the clouds might be right down on the hillsides and there might be no visibility whatever. In other words the pilot of an airplane flying on an airline in bad weather merely knows that the weather is bad, knows exactly how bad it is at the various weather stations, but does not know for sure how bad it is between those stations. Even with radio aids, which he may know he has done just what to expect at the various stations, he does not know exactly what to expect between them.

THE MODERN AIRPLANE is quite as adaptable mechanically as the automobile or the bus. Airplane operators are not now subject to failures due to automobile nature, and the percentage of crashes caused by motor or mechanical failures is small. The airplane today has reached a stage in its development where it can be considered a reasonably safe mode of transportation.

Unlike the train, however, the airplane has no rails to guide it so its destination through bad weather. Unlike the boat, that may remain stationary upon the water when enveloped by a fog, the airplane cannot remain suspended stationary in the air, cannot be slowed down or stopped until it settles on the ground. This inherent disadvantage may aviation enthusiasts seem to refuse to admit. Or if they admit so much they follow it with the remark that if the airplane cannot get through it will land. Of course it may land, but unfortunately in too many instances it has not landed safely.

And it is those instances that have resulted in the adverse publicity that is now has caused the general public to question the wisdom of flying. For the many of them do question the wisdom of trusting themselves to airplanes as unaided. Now one can answer that question satisfactorily by saying, "Be annihilated."

Now, in the mass is not annihilated—he is ground-crushed, as the nature of the case reveals him to be. He has a normal and normal fear of the unknown—and flying will be the unknown to him. If we can allow him natural fear, let us say, and then the unusual will be to him the usual.

But it is becoming apparent that we cannot shut that fear while we present frequent evidence that the fear is based on sound reasons. We must remove the reason. We must stop crash publicity by stopping the crashes. We must achieve safety. And safety will insure airplane's prosperity.

THE LAW and the Operator

Liabilities Imposed by Law on Carriers of Passengers for Hire

By HAZLETT MIRKIN

WITH the recent increase in public interest in all forms of aviation activities, and as a very natural result of this unrelenting, there have sprung up all over the country during the past year or two, or, possibly, variously continued, most often called "flying services," one of the most novel and fairly popular functions of which is the carrying of passengers for hire. These organizations may consist of one or two men who own a plane and, in addition perhaps, represent some manufacturer or distributor in sales and service capacity and who operate from some local flying field or in increasing degree in number of personnel and equipment, they may consist at the other extreme, of large corporations or subsidiaries of larger corporations, having investments in flying fields and facilities and in planes, amounting to hundreds of thousands of dollars. In the transportation of passengers, these flying services meet the liabilities of what the law terms carrier and these liabilities attach more the less to the person who operates a flying service cockpit plane than they do to the corporation operating a firm of aircraft.

When the term "common carriers" is used, the average person thinks, quite naturally, of railroads, trams, trolleys, steamship lines, bus lines and, perhaps, miscellaneous airlines or those operating between points far distant from one another. All this, generally speaking, do fall within the class in question but the class is by no means so limited. Anyone who undertakes for hire to carry all persons who may apply to land at there is room for them and as long as there is no legal reason for refusing such carriers is under the law, a common carrier and courts so various jurisdictions have held on many occasions that banks, fruit, jewelry, tobacco and various other retailers fall within the class. If a carrier holds itself out to the public as engaged in the business of carrying passengers, it is a common carrier. The distinction of the passengers is immaterial in determining the classification, as is the distance to be traveled, and it has been decided that a vehicle operating only between a railroad station and a hotel in the same town falls within the rule, as do taxable in the business of transporting persons from one part of a city to another.

It is interesting to note, that in a case argued some fifteen years ago in a United States District Court, the question as to whether or not taxicabs fell within the requirements of certain legislation affecting common carriers was left open, that having decided these were in such carriers, but there is no doubt that today they are to be regarded as such. By analogy an indi-

vidual or company operating a so called "taxi service" is subject to the liabilities which we are now considering. Indeed the mere operation of the five or ten seater passenger flights or "joy boys," which the operator finds as profitable on holidays when the weather is propitious, may well result in that operator being regarded by the law as subject to the liabilities of a common carrier, for the operation of a scenic railway who carried passengers on such railway far have been held to subject by a court in Illinois. If the degree of the service in this case does not dispose of a possible contention on the part of the operator of passenger buses that he isn't a common carrier because he doesn't go from place to place, then a series of cases holding that owners of elevators in buildings are common carriers would appear conclusive on the point.

Assuming that the character and surrounding circumstances are such as to constitute the operator of a passenger air service a common carrier, it is important for him to consider what his attendant liabilities may be. In this connection, there is common carrier he must be. In other words, when, being a common carrier, he holds himself out as being in the business of carrying to passengers all who apply for such carriage as long as he has room for them and as long as he has no legal reason for refusing, he is not at liberty to refuse unless his reason for so doing is valid in the eyes of the law. There have been no cases wherein legal reasons for refusal of carriage by aircraft have been defined, but the rules governing the business of a common carrier by aircraft may be readily assimilated to those applied to other common carriers and, in the case of other common carriers, persons infected with contagious diseases and persons who, because of physical or mental disability, are unable to care for themselves have been legally refused transportation. It has been held also that a railroad may refuse accommodations to persons who are so intoxicated as to be dangerous, offensive or annoying. The right of other passengers to a safe and convenient passage appears to be the backbone by which the legitimacy of refusal is to be determined and, accordingly, one who is only slightly intoxicated and who shows no signs that he will not conduct himself properly or take care of himself, has been held to be entitled to transportation by rail.

It is probable that any reason for refusal valid in law as affecting any other class of common carrier would be valid as such carriers, and there are many other reasons why transportation might be denied by the class of indi-

ment with which we are concerned, with even expectation that no court would doubt the obligation of the carrier along the lines in question had been violated. Certainly the degree of intoxication which would warrant a refusal to carry a passenger by air would be much less than in the case of other carriers, as would the extent to which the intoxicated passenger were liable for any reason to, take care of himself or be likely to require extra attention from the carrier, its employees or agents, or the other passengers.

Fortunately the liabilities of operators of common carrier aircraft to passengers are by no means so onerous, are fairly easy of definition and, while they may be regarded as onerous enough, they are not, strange as it may appear upon the surface, as heavy as the liabilities which attach to common carriers of baggage or freight. The common law liability of this latter class of carrier is that of an insurer and he is liable for all loss or destruction of or injury to the goods not occasioned by an act of God or of the public enemy. No proof of negligence is necessary. No such exceptional liability is imposed on the passenger carrier. Generally speaking, he is bound only to exercise as high a degree of care, skill and diligence in receiving a passenger, conveying him to his destination and sitting him down safely as the moment of convenience employed and the necessities of the case will permit and he is liable only for negligence to his passengers which are caused by his negligence in failing to exercise that which may reasonably be regarded as the proper degree of care, skill and diligence for such passenger's safety. To a number of states the degree of care required has been stated as the "utmost care, prudence and foresight that a prudent man engaged in the business, as usually conducted, would employ, that in such care as is reasonably practicable and can be exercised, consistent with prudent operation and the needs of convenience and speed."

Furthermore, it has been held that the "rule of strict liability" does not mean that the carrier must take every possible or conceivable care or precaution which might increase or assure safety, for that, as one judge has said, "would prevent the practical performance of the duty to transport with expedition, in accordance with the usual custom and practice of the business and would prevent the use of means of locomotion which, while necessary to speed, are well known to be in some extent imperfect." It is undoubtedly that the court had in mind common carrier aircraft, for the case in question was decided a number of years ago, but it is doubtful whether the same language has been held to apply, will be very rarely be caused for air transport companies in litigation which is bound to arise in the future between their clients and those careless passengers.

An important point for a common carrier to bear in mind is that his legal liabilities exist from the moment the relationship of passenger and carrier arises until such time as that relationship has been concluded, and are not limited to the period during which the actual transportation is taking place. Any standing passenger who, with the assistance of the carrier, gets on the carrier's premises, into the station, ticket office or waiting room at a time when such place is open for the reception of passengers, even though he may not have purchased his ticket, has become a passenger in the eyes of the law, provided he arrives by any means whatsoever at a proper place, in a proper manner and within a reasonable time before his arrival or departure. The contract as a passenger will

he has left the carrier's premises, unless through some voluntary act of his own or through some misconduct on his part, such as a refusal to comply with ordinary reasonable rules and regulations, he has himself brought about an earlier termination of the relationship. In a New York case it was decided that, where a railroad company ran a bus to and from its station, a person riding therein for the purpose of taking passage on a train was a passenger even though he had not bought his ticket or made any declaration of his intention to do so, and that as such passenger, he was entitled to recover damages for an injury received through the negligence of the bus driver.

Another point of the earlier cases on the question is that a common carrier of passengers could not by any means avoid its legal liabilities, that doctrine has not been altered and, except where a statute provides otherwise, such limitation may generally be brought about by special agreement, provided the exemption from responsibility is reasonable and just. In general, this limitation must be by contract with the passenger and the contract must be founded upon a valuable consideration, such as a reduction in fare or some equivalent concession. This contract need not be written, but it seems needless to advance the suggestion that, if oral, the contract may well be difficult or even impossible of proof. One thing of importance to remember is that there must be a contract and that no such contract can exist without the concurrence of the passenger in its terms and conditions, and, thus therefore, the carrier's attempt to limit its liability by the posting of little notices purporting to have that effect is usually of little value. The most effective method in that which sets out in full the terms of the contract in printed form, preferably on the face of the passenger's ticket, for the courts have held that such conditions are impliedly assented to by the passenger, when he accepts and uses the ticket. The right to limit liability by contract does not, however, extend to situations where the damage are caused through the negligence of the carrier or its employees, and the airlines are positively maintained in support of the proposition that a contract with a passenger entered for transportation purporting to be in effect or in limitation of that character of liability, even though that contract is agreed to by the passenger, is void as being against public policy. As a carrier of fact, in some states this restriction is expressly provided by legislative enactment or by the state constitution.

There can be little or no question but that operators of passenger carrying aircraft will more and more come to be regarded as common carriers under the law. Whether or not they are such under the circumstances of any particular case will be of the greatest importance in their determination of the responsibilities, liabilities and restrictions, which such a carrier must assume, as opposed to those attaching to a special or private carrier. Anyone who in any way owes a business of carrying passengers for hire will be able to arrive at a reasonably accurate conclusion as to the class within which he falls if he will bear in mind that, stated in its simplest language, the distinction between common carriers and private carriers is that the former hold themselves out to receive all who apply for passage when they have no room for them or when some other legal reason exists why otherwise they can be refused, whereas private carriers operate only under a special contract and deal with such persons as they choose.

June 30, 1938

June 30, 1938



A load of mail ready for shipment over the Montreal - Quebec air mail line.

THE Canadian AIR MAIL

By E. L. CHICANUT

THE DEVELOPMENT of the air mail in Canada is for various reasons of pertinent interest to the United States. In view of the ever closer commercial approach of the Dominion and Republic with increasing mail communications involved, correlation of services in the two countries is an important consideration. In fact for some time border lines, during up across the border from United States services, have been placed, wrongly upon the progress of Canadian development. Already it is suggested that certain phases of airmail and traffic in Canada, by reason of the fact that Canadian Atlantic ports are closer to Europe than those of the United States, may at some time have a significant bearing upon the delivery of mails in the western states. Other phases to compel attention will probably more in light with the further development of the service in Canada.

That the air mail has definitely come to constitute mail a factor in Canada life already is hardly needed in the fact that in the first ten months of 1937 a total of 411,809 miles were flown by airmail on that system and 284,741 lb. of mail carried, these figures comparing with 116,132 miles and 200,251 lb. of mail in the corresponding period of the previous year. This record was made without a single accident or untoward happening of any kind.

What Canada has been rapidly accomplishing in this direction can perhaps be even better appreciated by the statement that a trans-Canada air mail, linking Atlantic with Pacific, is definitely within sight. This marks the achievement of a goal is a remarkably short space of time. The development has come about so rapidly, in fact, that the country scarcely realizes the progress which has been made and for the most part people are conscious of the multiplicity of services which have been brought into operation looking to this end. The story of the air mail in Canada is a peculiarly romantic one from the inception of the first service through the various stages to within measurable distance of an all Canada system. In inauguration and expansion it has been quite unique because of the peculiarity of Canadian conditions. The experience of other countries were of but little aid to the Dominion in this as in other branches of aviation,

and Canada has had to pioneer her own way, finding her own solutions to the many problems encountered.

The air mail was born in Canada under the most novel circumstances imaginable. Its parent was the Dominion's first commercial aerial service, established, remarkably enough, away from the better routes of commerce and travel, operating from the edge of civilization into a newly discovered gold field in the wilds of Northwestern Quebec. The story of the enterprise of that first little band of commercial airmen is in itself an epic. They transported by air everything from entire mining crews

So raygarded are most of us with commercial aeronautical development in this country that sometimes we are apt to overlook progress made outside our borders. Five years ago the first air mail delivery in Canada was made in a mining camp far removed from civilization. Today the Dominion has a net work of lines, and plans under way for future development, that stand as a tribute to Canadian endeavor. In this article Mr. Chicanut gives a most interesting account of that growth. One point of particular interest that he brings out is that, whereas in the United States air mail development was from big city to big city, in Canada it has been from big city to places beyond the frontiers of modern civilization.

and elaborate machinery to fresh fruit and other items. Incidentally, because they made the trip into the heart of the driving field in almost no time, mail by other means it could not be accomplished in less than a week, they were guaranteed only to carry incoming and outgoing mail. Soon without authorization and totally without revenue they were transporting 90 per cent of the mail along the coast while the individuals with the government contract were taking in and leaving out very slim slices of ice cream.

Application was made to the government for a contract but could not be granted owing to the one in existence for the same service. However, after the situation had been thoroughly explained authorization was given for the issuance of a special stamp by the company which they could sell for revenue, to be offered to mail they carried by plane in addition to the ordinary postage. Thus the first air mail was born in the northern fastnesses of Alaska and Iceland, where growing civilization was just thrusting its tendrils into this continent while the contract by mail was out when the first regular government authorization to carry mail by plane was issued.

All unconsciously the Quebec group of aviators pointed the direction Canadian aerial mail development was to take. When new mail contracts in Newfoundland, Ontario and Manitoba resulted in routine and the development of new camps in the wilderness, aerial services to them from the edge of civilization were established at a very early stage and these were awarded government mail contracts. They have continued to operate with the highest efficiency under the most difficult and arduous of conditions under the direction of the Western Canada Airways, of which James Richardson of Winnipeg is president and W. L. Fitzmaurice, himself a famous pilot, is manager. Nearly 150 miles of absolute frost wilderness is covered in the regular flights to serve the Ontario mining camps and whereas dog teams in winter and cargo in summer would take in an average of 750 lb of mail per month the aggregate going in by plane is now 10,000 lb. A similar increase is noted in the case of the Alaska camp where regular delivery involves 300 miles of flying under the same conditions.

The airplane has completely revolutionized the progress of new mail camps in Canada and in no place more so than the daily or frequent receipt and transmission of mail. Such service is being extended to new camps of prospectors to justify its coming into existence. In December 1929 the Canadian Transcontinental Airways, of which Archie Lowe is president, inaugurated a regular mail service into Chukotkan, a yet newer mining field in Quebec, flying from Oshkosh to the Canadian National Airways, the nearest flight being one of 130 miles.

From this stage beginning the air mail in Canada progressed in almost the same neat manner and the services which followed were not, as one might expect, between the main centers of population but in the outer edge of the way places where mail was received irregularly and infrequently. Thus in the winter months planes flew with mail from Quebec City to such points along the north shore of the St. Lawrence as Murray Bay, Restoule, and Saint-Johns, where the again had been accessible only by dog team. This service is resumed every November by the Canadian Transcontinental Airways. Similarly the London Air Transport regularly puts into effect a winter service from Lunenburg to Pelly Island which, due to ice conditions, was formerly

practically cut off from the mainland after five-and-a-half winter service to be inaugurated was from Montreal to New Brunswick to the Maritime Islands where formerly a weekly cable letter had been the only communication with civilization in this area.

Similar consideration induced the government to give the most readers of mail deliveries to the far trading posts of Northern Alberta and the Northwest Territories where conditions of life and means of transport have remained virtually unchanged since the Hudson's Bay Company established them more than a century before. In November 1929 a regular air mail service was established through the Commercial Airways of Edmonton, of which C. Becker is managing director and president, between Fort McMurray, Alberta, and the Northwest Territories, linking up the posts of Fort Chipewyan, Ft. Smith, Ft. Resolution, Ft. Ross, Ft. Providence, Sledge, Winnipeg, Norman, Good Hope, Arctic Red River and McPherson. Four trips a week are made on McPherson—two Fort Resolution to Great Slave Lake, 512 miles away, and return in the same day, and two to Fort Simpson, halfway point to the Arctic, flying north one day and returning the next, with stops at intermediate points.

When General Canada, the most thickly populated section of the Dominion, received first attention from the government it was in connection with the spending of the receipt of mail from, and their dispatch to, Europe. The first point of attention being with the mail in the St. Lawrence gulf, it is at Quebec Point, 350 miles below Montreal, where the pilot goes aboard and where he leaves from vessel Europe-bound. Taking the mails off the steamship at this point and flying it to Montreal it was estimated would result in a saving of from 20 to 50 hours in delivery to the fall of 1929 the Royal Canadian Air Force carried out extensive experiments in the St. Lawrence gulf and upon the success of these a contract was awarded the Canadian Transcontinental Airways and the service inaugurated in the spring of 1929.

During the summer months twice a week mail is flown from Montreal to Father Point to avert the vessels which have left Quebec and Montreal for Europe, and two return trips are made to Montreal. On the second trip when there are no trans-Atlantic mails to carry, mail is taken off the train at Father Point, where the service flows in Montreal, this resulting in a saving of some 16 hours in delivery. Altogether a time saving of as much as 48 hours has been effected in the delivery of incoming mails, and as much as 90 hours have been saved in the delivery of Canadian mails to Europe.

The Central Canada centers of Ottawa and Toronto were next offered daily mail contact with the metropolis and the benefits of the rapid transmission of European mail extended to them. Canadian Airways of Montreal operates this service which was inaugurated in May, 1928, making a weekly mail service, using First-class PC2 machines and H331, flying twice. In the 628 trips made in the first six months of 1929 some 37,915 lb. of mail were carried.

In January, 1929, the Department of National Defense inaugurated a cross-country experimental service between Halifax and Saint John, the service being a daily north and twice weekly between Ottawa and Halifax with intermediate stops at Montreal and Saint John. This was undertaken by the government to secure a knowledge of flying conditions over the route, and following the re-

fully successful experimentation, the inauguration of a regular service is only waiting on greater progress being made on air harbors in that territory.

This will form a leg of the trans-Canada air route, and considerable time saving will be effected. Mail from Halifax will be carried over to Saint John in concert with the Canadian Pacific aluminum train for Montreal. The bi-weekly service will connect with outgoing and incoming mail steamers at Saint John and Halifax. The plant will leave Ottawa, taking mails from the incoming trains from the west, pick up Montreal mails and mails reaching the metropolis from Toronto, then proceed to Saint John, arriving at noon and leaving about three-quarters of a day. The return trip from Saint John will be made in the same manner and result in an equal saving of time.

The first international development of the Canadian air mail was, logically enough, between Montreal and New York. This has been operated daily since October, 1928, by the Canadian Colonial Airways of Montreal, with great success, being of great convenience to business men on either side of the border. In the first nine months of 1929, 217 trips were made in which 12,515 lb. of mail were carried. This service affords Canadian business men a wide air, through Montreal, connection with Ottawa, Toronto, and other centers, the facilities of the various services national and international, operating out of New York.

In the autumn of 1929 further international contact was achieved through the inauguration of a service between Toronto and Buffalo operated once a week by the Canadian Flying Service, and a daily one-way service between Montreal and Detroit via Toronto, Hamilton



Mail plane stopped at a small road on the Detroit-Buffalo line.

and Windsor and, much of which mails are delivered and picked up, by Canadian Airways, Ltd. In the quarter ending September 30, 90 trips were made on the former service, carrying 17,775 lb. of mail.

A feature of the Canadian service to Detroit, which may prove to have some significance, is the greater use to which steamships on the St. Lawrence can be put for the carriage of loads for the Pacific coast through the established mail services between Father Point and Montreal. Mail train ashore at this first point of seamen land contact and carried by air to Chicago over existing routes will arrive there sooner than if forwarded to New York to mail planes. Even in winter, with the inauguration of an air service between Halifax and Saint John and Montreal to connect with the Montreal-Detroit steamer line, it will be possible to have western mails carried very rapidly to their destination.

Other air mail connections between United States and

Canadian centers through feeder lines are at present apparently merely awaiting progress upon the trans-Canada air mail. For instance, it is understood that plans have already been drawn up for an extension of the service from Minneapolis to Fargo to reach Winnipeg. The service at present terminating at Great Falls naturally suggests an extension to Southern Alberta cities, while Seattle, Washington, and Victoria British Columbia, are already connected and mail service could be inaugurated any time.

As time wears the obvious goal of an air mail service connecting from coast to coast has been kept in sight. The first link in the chain, the route between the Maritime Provinces and Central Canada, has been completed and an experimental service operated with complete success. At the present time landing fields are planned for intermediate points and when these are completed the service will be ready for regular operation. Surveys of the main link, the route between Ottawa and Winnipeg via Sudbury and between Toronto and Sudbury have also been made, but owing to the difficulties of terrain in this rugged sector this will also have to wait upon the establishment of landing fields at considerable expense.

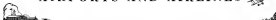
An experimental service inaugurated in the Christmas season of 1928 between Winnipeg, Regina, Saskatoon, Calgary, Edmonton and Vancouver, operated by the Western Canada Airways, was entirely successful. In the spring of 1929 progress was made covering intermediate links between Regina and Saskatoon, and because of emergency landing fields along the 1,200 mile route. Radio buoys were adopted as being considered superior to the visual buoys.

All was in readiness for this by November, 1929, and before the end of the month the service was regularly inaugurated by the Canadian Airways. Mail is now taken from a transcontinental train at Winnipeg and flown immediately to Regina, and so to Calgary and Banff, the western terminus, a saving of 24 hours being effected in the time of delivery of eastern mails to the west. A winter saving of time is made at everything the transcontinental train involving cost at Winnipeg. The northern sections of the western provinces are served with aerial mail by planes which take the eastern mail en route from Regina to Saskatoon and from Calgary to Edmonton.

The final link of the trans-Canada air mail chain are being made over a route from Vancouver to Calgary through the Crow's Nest Pass of the Rocky Mountains, while an alternative route from the Pacific coast by way of Edmonton may also be surveyed. Plans for the trans-Atlantic air mail in the lower Dominion of the Pacific coast will be completed by this summer, according to official pronouncement, and by the summer of 1931 the entire trans-Canada air mail is expected to be functioning properly.

Altogether it has been a remarkable development, none about the men part so unobtrusively that even the Canadian people have no adequate conception of what has taken place. Five years ago the first air mail was started into a new, struggling, rising camp for beyond civilization's frontiers. Today there are more than 100 air mail planes in the land Dominion, carrying their daily air mail, several of the leading cities are connected by mail by air services, a trans-Canada service is well within sight, and Canada has air mail touch with United States centers, and through them with services all over the Republic and South America.

AIRPORTS AND AIRLINES



One Lost as Colonial Plane Lands in Water

BOSTON (AP)—When a ring of ice in the harbor stopped No. 1001 of the Colonial passenger service between New York and Boston landed on the edge of the ice off the pier at the foot of the June 8, the machine was driven to land in shallow tide water east of the terminal apron and was overturned, apparently due to improper taxiing. The ship lay heavily tilted. All others on the plane-boat were an average load of 100 passengers, with first-class pilots—crashed with minor injuries and a waiting line for the delayed loading at the pier.

A preliminary report by a Port & Whitney engineer was to the effect that there was nothing wrong mechanically with the engine. However, it has been sent to the factory for a thorough examination. Pending a report from this, E. L. O'Brien, chief aviation inspector, has delayed the engine's scheduled test to two days after the accident. The pilot has assumed he caused the engine failure, claiming that the majority of the evidence on this point corroborates his statement.

The accident was the first on the passenger line in which a life boat has lost since passenger operations were resumed more than a year ago. Freight and company authorities are investigating and with the latter report, a fairly complete investigation is still being conducted as to the cause of the accident. [Believing that an involved assessment of accidents will be of more benefit to the industry, the following is a policy of effect on such reports: In future, following American Bureau of Shipping, these events, when they are present, are points of special interest to the operator of industries—Ed.]

Schedule Increased

The regular Colonial passenger planes, operating between this city and New York City, will be flown on a schedule of four round trips per day instead of three. The change will start June 5, making the schedule as follows: Three leave here for New York at 8 and 10:30 a.m. and at 1 and 4:30 p.m.; planes leave New York for this city at 9 a.m. and at 12:30, 3 and 5:30 p.m.

The increased ship requires about 110 to 120 cars and the increased flight requires about 210. Buses are available at either terminal at a reduced rate. Service. May the company's planes carry a total of 1,500 paid passengers, an increase of 500 per cent over the volume for April, will be the volume for paid passengers on the Vermont seven extra tickets on one round.

Cleveland Operators to Organize CLEVELAND (AP)—The Cleveland Airport Operators Association has decided to do an advertising and publicity campaign to bring the advantages of Cleveland Municipal Airport before the country's pilots. A campaign to stimulate local interest in aviation and its airport will be initiated this week.

Manner Line Links

Spokane and Twin Cities

MINNEAPOLIS (AP)—Manner Air Transport inaugurated its three-weekly passenger service between Spokane and the Twin Cities on June 5. The trip is made in approximately 12 hr. of plane, operating Mondays, Wednesdays and Fridays and Saturdays. The line connects at Spokane with the Spokane-Salt Lake service of Manner Air Transport and at Minneapolis with the line to the Twin Cities-Chicago line of Northwest Airways.

Operating schedule of the line is as follows:

Westbound		Eastbound
6:45 a.m.	10:45 a.m.	6:45 a.m.
10:45 a.m.	12:45 p.m.	10:45 a.m.
12:45 p.m.	2:45 p.m.	12:45 p.m.
2:45 p.m.	4:45 p.m.	2:45 p.m.
4:45 p.m.	6:45 p.m.	4:45 p.m.
6:45 p.m.	8:45 p.m.	6:45 p.m.
8:45 p.m.	10:45 p.m.	8:45 p.m.
10:45 p.m.	12:45 a.m.	10:45 p.m.
12:45 a.m.	2:45 a.m.	12:45 a.m.
2:45 a.m.	4:45 a.m.	2:45 a.m.
4:45 a.m.	6:45 a.m.	4:45 a.m.
6:45 a.m.	8:45 a.m.	6:45 a.m.
8:45 a.m.	10:45 a.m.	8:45 a.m.
10:45 a.m.	12:45 p.m.	10:45 a.m.
12:45 p.m.	2:45 p.m.	12:45 p.m.
2:45 p.m.	4:45 p.m.	2:45 p.m.
4:45 p.m.	6:45 p.m.	4:45 p.m.
6:45 p.m.	8:45 p.m.	6:45 p.m.
8:45 p.m.	10:45 p.m.	8:45 p.m.
10:45 p.m.	12:45 a.m.	10:45 p.m.
12:45 a.m.	2:45 a.m.	12:45 a.m.
2:45 a.m.	4:45 a.m.	2:45 a.m.
4:45 a.m.	6:45 a.m.	4:45 a.m.
6:45 a.m.	8:45 a.m.	6:45 a.m.
8:45 a.m.	10:45 a.m.	8:45 a.m.
10:45 a.m.	12:45 p.m.	10:45 a.m.
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10:45 p.m.	12:45 a.m.	10:45 p.m.
12:45 a.m.	2:45 a.m.	12:45 a.m.
2:45 a.m.	4:45 a.m.	2:45 a.m.
4:45 a.m.	6:45 a.m.	4:45 a.m.
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10:45 a.m.	12:45 p.m.	10:45 a.m.
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10:45 p.m.	12:45 a.m.	10:45 p.m.
12:45 a.m.	2:45 a.m.	12:45 a.m.
2:45 a.m.	4:45 a.m.	2:45 a.m.
4:45 a.m.	6:45 a.m.	4:45 a.m.
6:45 a.m.	8:45 a.m.	6:45 a.m.
8:45 a.m.	10:45 a.m.	8:45 a.m.
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8:45 p.m.	10:45 p.m.	8:45 p.m.
10:45 p.m.	12:45 a.m.	10:45 p.m.
12:45 a.m.	2:45 a.m.	12:45 a.m.
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6:45 a.m.	8:45 a.m.	6:45 a.m.
8:45 a.m.	10:45 a.m.	8:45 a.m.
10:45 a		

Foreign Briefs

Daily service has recently been inaugurated on a scheduled service between Vienna and Budapest, and has been extended to the Vienna-Tripoli route of a line which will eventually link Milan and Munich.

Passenger flying by 200 planes, a historic payment and 200,000 marks on the program of the French Air Force show, held at Versailles, June 6-9.

It is reported that Société Régionale has secured license to manufacture Short flying boats in France.

Belgium and Mexico recently completed a 15,000-mile demonstration tour of eastern Europe and northern Africa in a Parnass 794 which was loaded with 250 passengers from Belgium and Mexico.

Marcel Armand recently completed a 5,000-mile tour of Spain and Algeria in a Parnass 184, with 230 lbs. Titan engine.

The properties of light alloys at La Beuvette according to a report survey in the United States include aluminum, magnesium, and zinc.

Weyman-Lapere company is planning to start construction of a new factory, following development of a new type nose landing gear at Villeneuve.

A proposal is under consideration for operation of a French Congo-Madagascar road line by the Air Force.

Following the ground organization developed by Compagnie Transaérienne, Belgium is particularly anxious for early inauguration of service.

The French Air Ministry is considering establishment of a new Paris-Brussels line. Only one line being considered sufficient for the growing needs of commercial and Air Force.

The Paris Chamber of Commerce has calculated a proposal for flying over the operation of these airports, with a maximum capacity of 100,000.

Major Mian and Commander Arceus Stoll, who are attempting to break the endurance record for balloons, were flown in a balloon over the Alps.

A new commercial airport at Bristol, England, was dedicated May 31.

In his Willer Wright Memorial lecture, Lt. R. R. Borden said that neither the air and waterborne regions were approaching their limits of performance, and that radically different types would now be needed.

"Valent", an eight-passenger twin-engine monoplane weighing one ton, built by Robert Borden, was launched recently and will undergo tests, in comparison with a flying boat of similar size, in these Jupiter engines.

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Luft Hansa
1929 Report

(Continued from page 1861)

only one new one was started. This was from Berlin to Paris via Frankfurt and Stockholm, with a branch from Stuttgart joining it at the latter point. Night flying with mail was begun on the Berlin-London and Berlin-Paris routes, with experimental service from Berlin to Moscow and to Stockholm. The long-range retirement of some planes from service, the company's fleet of planes increased during the year from 10 to 125 planes. Of these, 10 and 42, were used for transport planes. By concentration of service based at Stettin, most of Berlin, the long-range retirement of some planes was reduced from \$2,540,000 to \$1,940,000. Improvements in equipment consisted of 30 new drivers for planes and 221 new drivers for powerplants. Wheel brakes were installed on wing planes, and vibration dampers for landing gear were developed. Synthetic gasoline produced by E.P. Perkinchima was used successfully on four lines. The number of miles flown per accident in which an injury occurred in 1929 was 1,000,000. The number of miles flown per accident in which an injury occurred in 1929 was 1,000,000.

While there does not seem to be any hope for the industry to be brought up to the 1926 level in the near future, the report suggests some satisfaction with the progress with the Government in the use of a new type of aircraft, which makes part of the uncertainty inherent in the former yearly contracts. The report also indicates that the company has to own planes and equipment from German firms directly, and that the company has to own planes and equipment from German firms directly, and that the company has to own planes and equipment from German firms directly.

However, it is estimated that 2,000 of the miles of 1928 to 1915 at the end of 1929.

Special services included last year were a military adaptation of the four-engine "Blackburn" Mk. 10.

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Plans



SIDE SLIPS

By
Robert R. Osborn

It seems in another matter such as going over into tomorrow's position, part of it to a report head line in the New York Times (also reprinted by R.H.J.) "Pilot Says He Flew Only Twenty Miles In The Airplane, On A Month's Night Bath House."

From this and other stories we have heard we have decided to have an expedition to be a first pilot on a passenger (transport) line. For instance H. H. P. Jr. reports that on one of his recent drop trips the first pilot, speed up to the forward edge of his morning paper, while the reserve pilot took the ship off the line to the destination and had just about finished his morning's reading as the reserve pilot finally landed the ship after making three passes at the field.

We see by the papers that one of the new pilots had to defend the American City has been fitted with an air conditioner must have an approved airplane factory. Another aircraft factory recently built a disassembly wing and other various designs is making them out of the air with drilled on the property. Disassembly is apparently what we need to take in over the last period.

A clipping from the *Illinois Journal* (not in T.A.K. Quater) says Lindbergh is making a new tendency for future designs is toward "all metal airplanes." This will certainly be true if business continues to be in poor as it has been.

My W. H. E. is in an interesting item from the *Illinois Observer*. "Should want to be pilots, repaired the damaged under carriage and the planes set to a low and set his engine going full speed. When the machine lifted from the ground a fumes at the nose and the plane started about like a rocket. Even then the steering gear, looking like a branch, could barely rise above the towering forest trees. A topmost laugh from the fabric from underneath the fuselage and the machine quailed, but kept up, and Smith got it safely to the aerodrome."

The Intrepid Aviator in one of our papers with this clipping and commented that if the pilot had been a bit more cautious and closer to the ground, it would have been a normal take-off for a Jenny.

Comes From Our "Old 1000" Collection

When to 1,500 feet altitude, — ent the pilot of his monoplane as — — — — — a parachute jumper, leaped into the air. It took him only five seconds to land safely but it was over five seconds later that the wheels of the monoplane touched. Recently the pilot had a really serious accident 120 feet before landing. — — — — — was performed to show that it is just as safe to land a really serious airplane built for stability in the air as well as speed as it is to take to a landing in a forced landing in emergency." From the *N. Y. Evening Post* about two months ago.

Another item from the *Illinois Journal* brings us light a very serious matter which we think should be brought to the attention of the Department of Commerce. "C. O. Bell, chief of the Goodrich Rubber and William M. McConnell, first pilot, staged a little private race around the four corners from Chicago, Wednesday, night representative of the United States who attended the Chicago Air Line conference a month on McConnell as this, moved the airport proceeding toward it via a short cut which made it possible for him to take a landing ahead of the first plane." — — — — —

American Journal that there are not permitted by the Department of Commerce, as they are out on the "hot" side of the "hot" which will indicate a considerable increase in flying each year.

Our recently late being leaders for entering airplane pilots in progress nearly. Mr. S. L. E. of Bristol, Pa., sends us a photograph of four men standing at the tail of an airplane which was abandoned after a landing in the system, and we pass along his suggestion that four men should manufacturers should observe the extreme low value of their products along with the other properties.

Apparently the Curtis Company is going to have a lot of competition in the flying sphere because on planes or boats. The ramp is stretched to the glider and, traveling at a high rate of speed down the field toward the

glider and to one language and the action of the airplane. It was the air." — — — — — discovered by S.C.P. in a Seattle paper.

Undoubtedly you have all seen pictures of the new glider designed and flown at Old Orchard Beach, Me., which looks like a regular glider but is built with a motor and which allows the wings to furnish the motive power. We had been promising you years that someone was going to try that this month day, but when it actually happened we were so surprised we could not find forgotten all of the length of the story, but when it came to that subject. Therefore we are glad to have the book over to R.H.J. of the *Red Bank, Md.* with which we are not that good the picture is so with his remarks. "The terrible dangers of the forced landing, already largely mitigated by such advances as balloon flippers and elastic wings, have now been entirely eliminated by the new emergency parachute secured by the invention of flying, which should be looked by every aviator in accordance with its tremendous significance. Pilots who run out of gas need only to run up the fuselage and continue safely on their course. Indeed, even the forced landing with its danger factor is completely out of date compared with the aviation sailing board and sail, with its danger dependent upon the five winds at the mercy of its motive power, with its first hand and its fine point to strong the water on its course. Too high, but safety in the permanent consideration. If a sailboat tips over the occupant must swim or drown, but in a sailplane, held safely by belts, they could sail along comfortably regardless of the size of the gusts, the sails lose none of their effectiveness in the inverted position. A little disorganized, but have observed a slide sailing disorganized but a reef or two in the job and a new maniplation will satisfactorily correct that. You know, my brother."

We can see several reasons why this invention will never be a success in the United States. In the first place we have all had credit on the U. S. so that most country could be all sailing with sails alone built. Then, for the very reason there is no motor for the Californians to overlook in flight, although we might be able to get some sort of a crew's end for them to do tricks in. Possibly Miss H. L. of Illinois might find some use for it with all of the birds they have down there. So we suggest that it be exported immediately.

AVIATION
June 24, 1928

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June 24, 1928

Timken Bearings Add Safety And Efficiency To Modern Aircraft



Typical bearing mounting for wheel hub.



Typical bearing mounting for wheel hub.



Typical bearing mounting for wheel hub.

Aircraft engineers have been quick to appreciate and utilize Timken advantages in airplane development, as an inspection of the latest types of aircraft will show.

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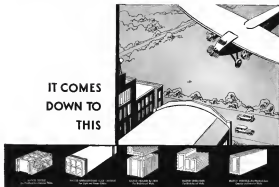
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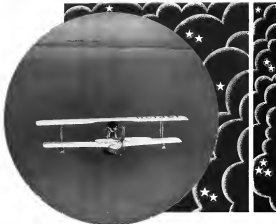
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Wing Area	130 Sq. Ft.
Length Overall	23 Ft. 2 in.
Height Overall	7 Ft.
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